



Playdate Teardown

Panic, the company behind this yellow...

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INTRODUCTION

[Panic](#), the company behind this yellow not-a-Game-Boy, say they made this quirky device “just for fun,” and it shows. From the 1-bit screen to its distinctive crank, the Playdate radiates novelty. We just hope it’s as much fun to tear down as it is to play!

Full disclosure: Our teardown unit came directly from Panic, who, refusing all manner of bribes, sent us a teardown unit for free. Unfortunately it didn’t come with any games, so a teardown was about all it was good for. Little did they know, teardown is our favorite game. (Okay, they probably did know that.)

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TOOLS:

[Goose](#) (1)

[Knife](#) (1)

[Flathead 4 mm Screwdriver](#) (1)

[iFixit Opening Picks \(Set of 6\)](#) (1)

[ESD Safe Blunt Nose Tweezers](#) (1)

[Phillips #0 Screwdriver](#) (1)

Step 1 — Playdate Teardown



- Some specs for you while we unbox the fun:
 - *Extremely high resolution* (400×240) display—2.7 inches at 173 ppi
 - 180 MHz ARM Cortex-M7F CPU
 - 16 MB of onboard memory
 - 4 GB flash storage
 - 2.4 GHz Wi-Fi (b/g/n), Bluetooth 4.2, USB-C, headphone jack
 - Mechanical crank because why not
- It's clear they haven't goosed the specs on this thing—but then, if you were obsessing over specs, you've already missed the point.

Step 2



- As per usual, we kick things off with a cranking good exploratory X-ray from [Creative Electron](#).
 - ① The big fuzzy rectangle at left looks like a battery. The castle turret at the top is a printed wireless antenna of some sort. The dark rectangular formation oughtta be a speaker. The crank is easy to spot. And those little dots? Solder balls, for the chips—sooooo many chips.
- Technically this shows everything inside, so... our job is done?

Step 3



- Inside the crank handle cavity: some secret intel.
- ① Model number **PDU1-Y**—or is it [PDU-Y-01](#)? Either way, it's exactly what we expected.
- Our serial number is 1255. Who got the first 1,254 units? No idea.
- Hopefully they didn't think to take it apart and put it on the internet. Seriously, who would do that?
- *Answer:* someone not intimidated by these donut-shaped flathead screws. Mmm... donuts.
- Hang tight while we noodle on a strategy for opening this thing. If we have to eat a dozen donuts in the process, that's a sacrifice we're prepared to make. Will that help? Somehow yes.

Step 4



- That yellow shade... it seems familiar, somehow.
- ① A quick dive into the old dresser drawer, and we recover this 23-year-old prize. It's a match! [1998](#), meet 2021. What a matchup.
- Things that are *not* a match:
 - Physical volume—the Playdate handily wins here. Is it even 1/4 the size? ...seriously, is it? We're not here to measure things for you.
 - Display quality—another win for the Playdate, provided spinach isn't your favorite color.
 - Crankiness—again, nod to the Playdate.
- *Take it apart already*, we hear you say. *As soon as we finish our spinach*, you hear us say. And then you wait patiently for the rest of the teardown. Right? Hello?

Step 5



- In we go! We grab our big flathead driver for this most diminutive console, and twist away some screws.
- Next, a few plastic clips stand guard at the entry point. We're careful not to let any precious nostalgia escape while we wield our opening pick.
- First look inside reveals: Tidiness. Yellowness. And an easily-accessible battery, a.k.a. repair happiness.

Step 6



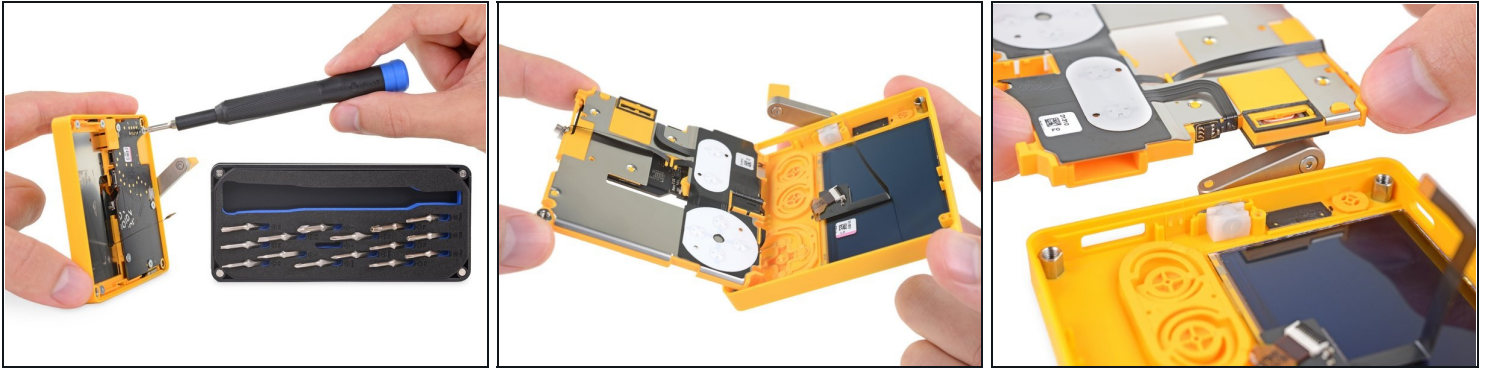
- Hold up—there's some sort of warranty sticker guarding this battery.
- Zoom and enhance?
- Oh, wait: *breaking* voids your warranty, not simply *opening*. A tip of the hat to the good sirs [Magnuson and Moss](#), and we carry on—carefully.

Step 7



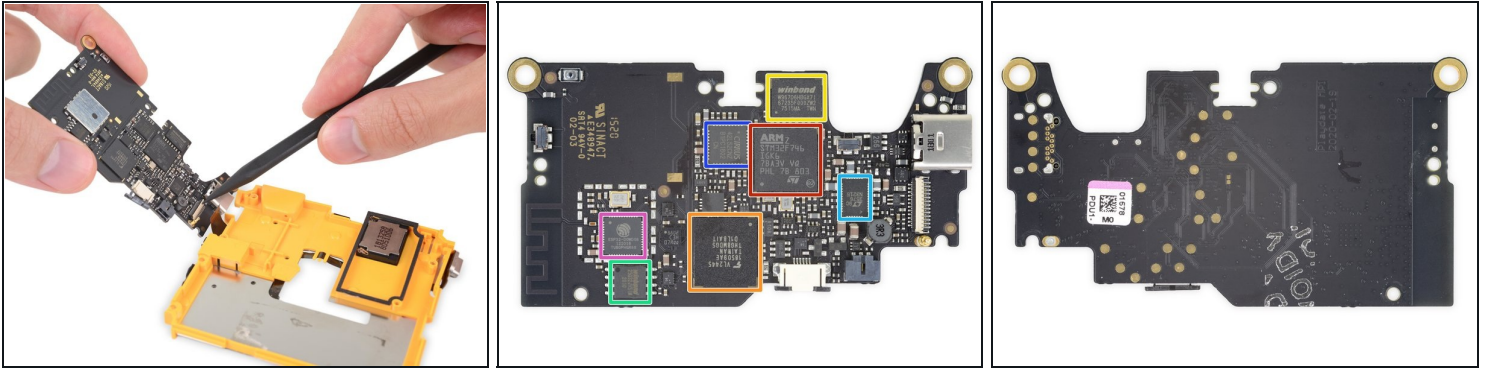
- Battery unpluggability: 8.5/10, mostly easy. Just make sure you don't poke anything flammable with your [tweezers](#).
- The battery itself is mildly glued down. Be persuasive, but don't make it angry.
- Battery specs? It clocks in at 2.74 Wh (740 mAh @ 3.7V).
- That's about 25% of the capacity of an [iPhone 12](#), or:
 - 1.9% of a small car battery ([kind of](#))
- Inside the range of the sort of "general purpose" AA battery that Game Boys ate for sport
- Close in performance to a 500-pound [potato battery once driven around Portland, Ore.](#)

Step 8



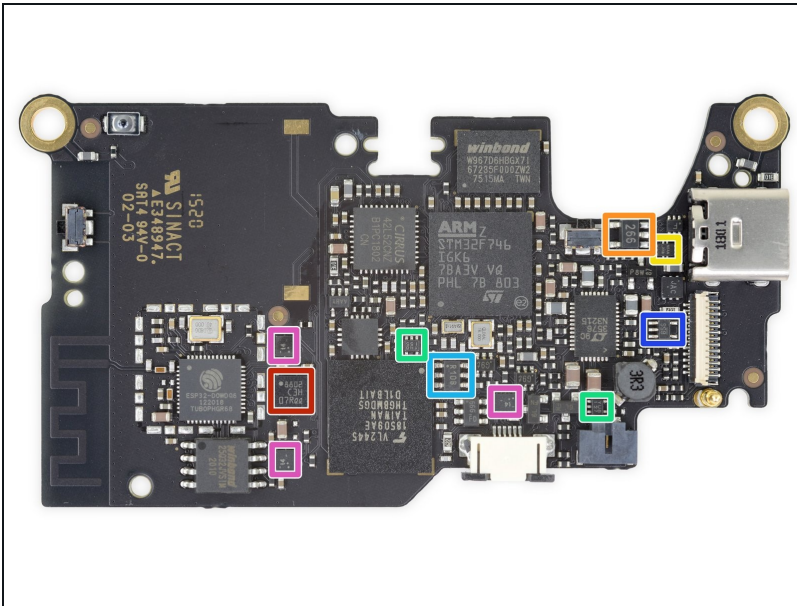
- With our minimalist [Minnow Driver Kit](#) applied to a minimalist device, we separate *pretty much everything* from *pretty much everything else*.
- Both the display and crank stay comfortably ensconced in the forward housing, along with some button covers.
- Everything else just flips out, provided you're deft with a spudger and can persuade a few small ribbon cables to stand aside.
- And here we get an early look at how the crank works. No gears! No funny business! Just a nice simple Hall-effect sensor and a ... thing ... enshrouded in white plastic. Important? We'll see.

Step 9



- More crank action in a minute, but first: Let's see what powers this pocketable piece of gaming goodness. The hidden side of the board contains:
 - STMicroelectronics [STM32F746IGK6](#), an [ARM Cortex-M7](#) based SoC
 - 4 GB of Kioxia (formerly Toshiba) [THGBMDG5D1LBAIT](#) eMMC NAND flash memory
 - 128 Mb of Winbond [W967D6HBG](#) low-power SRAM
 - 32 Mb of Winbond [W25Q32JV](#) serial NOR flash memory
 - Analog Devices (formerly Linear Technology) [LTC3576](#) power management IC
 - Cirrus Logic [CS42L52](#) audio codec w/ headphone/speaker amplifiers
 - Espressif Systems [ESP32-D0WDQ6](#) Wi-Fi and Bluetooth SoC

Step 10



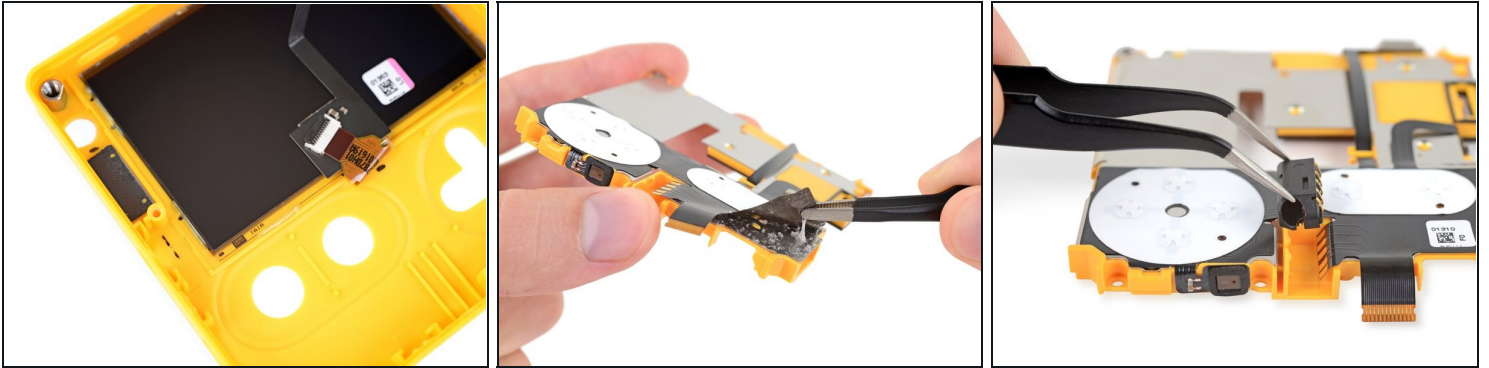
- This small board is packed full, so let's continue!
- STMicroelectronics [LIS3DH](#) 3-axis MEMS accelerometer
- Allegro MicroSystems [A1266](#) Hall-effect switch
- ON Semiconductor [FUSB301TMX](#) USB Type-C controller
- Rohm [BU4216FVE](#) and [BU4227FVE](#) 1.6 V and 2.7 V voltage detector
- Texas Instruments [REG710NA-5](#) 60 mA buck-boost charge pump
- Microchip (formerly Micrel) [MIC5365-3.3YC5](#) 150 mA / 3.3 V LDO regulator
- NXP Semiconductor [NTB0104](#) voltage level translator

Step 11



- Time to pull the pin on this crank.
- Out it comes. There's a cylindrical magnet embedded in the shaft. As it cranks, the rotating magnetic field hits the aforementioned [Hall-effect](#) sensor, which activates ... something, in your game.
- One thing this crank won't do? [Drift](#). There's no wiper or spring or sensor surface to wear out. The design is simplicity itself. You might even say there's ... no cranky-panky.
- ① The Hall-effect sensor used here is an Infineon [TLV493D-A1B6](#).
- Elsewhere on the front side, the tiny mono speaker is adhered in place. Pretty easy to remove, but would be fussy to rework and replace.

Step 12



- Here's where our disassembly efforts get gummed up.
 - The display—rumored to be a [Sharp Memory LCD](#)—seems firmly glued to the front half of the plastic enclosure. If you need to replace your display, you'll probably need a whole new plastic face—we were not confident we could separate the screen without destroying it. Probably not expensive, but not ideal.
 - Meanwhile, the buttons and other various I/O live on this sprawling flexible printed circuit, which is glued to the midframe. We started to un-glue it before realizing this wasn't a good, or reversible, idea.
 - One *huge* bright spot, though, is this 100% modular headphone jack. Is that considered *retro* now? Whatever the case, we're big fans.
- ① A Knowles [SPH1642HT5H-1](#) MEMS microphone can be found near the headphone jack, too!

Step 13

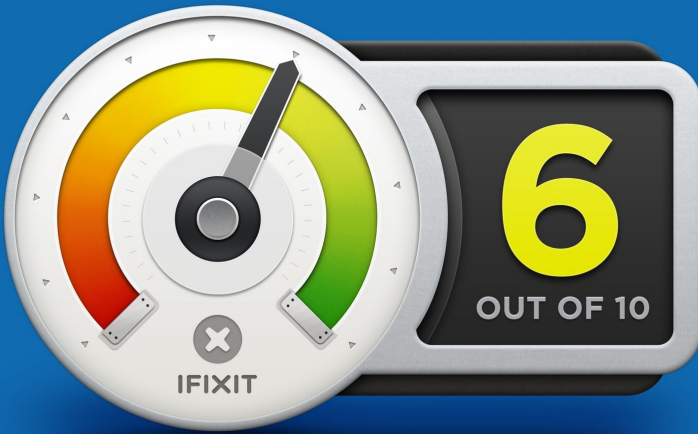


- Does it go back together and still work? Indeed it does. That's a good sign. Stay tuned for a video with proof of life, and then we'll tear it down all over again.

- ① Our repairability scoring model isn't well-calibrated for the Playdate (although we'll give it a go). It exists in a category all its own, and, like the device itself, we dug in mostly for fun.
- As you can likely tell, however, getting inside and getting some parts out isn't too painful.
- Speaking of parts: Panic developed this little gadget in collaboration with Teenage Engineering. Hey, [we know them!](#)

Step 14 — Final Thoughts

REPAIRABILITY SCORE:



- The Playdate earns a **6 out of 10** on our repairability scale (10 is the easiest to repair):
 - A big flathead screwdriver and an opening pick will get you inside.
 - You can twirl away all the internal (Pozidriv) screws with a basic Phillips driver.
 - The battery is immediately accessible and only lightly adhered in place.
 - The headphone jack is completely modular, and the crank design is simple and serviceable.
 - You can swap the display, but only if you replace the entire front case.
 - All of the controls are aggregated onto a single FPC—easy to swap, but a bit wasteful if only one thing breaks.
 - The USB-C port is soldered to the main board.